AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-23 (canceled)

24. (currently amended) A system for determining the instantaneous amplitude (a) and phase (φ) of an analog sinusoid comprising:

a vibratory sensor which produces said analog sinusoid output in response to the measurement of a parameter;

an analog-to-digital converter which receives said analog sinusoid from the sensor and converts said analog sinusoid to a digital sinusoid to form the in-phase component (I) of said sinusoid;

a Hilbert transformer approximation device which receives said digital sinusoid and produces the quadrature component (Q) of said digital sinusoid by introducing a phase shift to said digital sinusoid; and

a Coordinate Rotation Digital Computer (CORDIC) comprising:

an amplitude computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous amplitude (a) of said digital sinusoid by processing said in-phase (I) and quadrature (Q) components according to the equation $a = \sqrt{(Q^2 + I^2)}$; and

a phase computation device which receives said in-phase (I) and quadrature (Q)

components and computes the instantaneous phase (φ) of said digital sinusoid by processing said in-phase (I) and quadrature (Q) components according to the equation $\varphi = \tan^{-1}(Q/I)$.

25. (original) The system of claim 24 wherein said Hilbert transformer approximation device further introduces a predetermined delay into said quadrature component (Q).

26. (original) The system of claim 25 further comprising a delay device which introduces said predetermined delay into said in-phase component (I).

Claims 27-35 (canceled)

36. (currently amended) A method of determining the amplitude (a) and phase (φ) of a sinusoid comprising:

A. measuring a parameter of an object with a vibratory sensor;

B. generating an analog sinusoid representative of said parameter;

C. digitizing said analog sinusoid to produce a digital sinusoid;

D. filtering said digital sinusoid to attenuate out-of-band noise in said digital sinusoid;

E. introducing a delay into said digital sinusoid to produce an in-phase signal (I) associated with said digital sinusoid;

F. performing a Hilbert transform approximation of said digital sinusoid to introduce a phase shift plus delay into said digital sinusoid, thereby producing a quadrature signal (Q) associated with said digital sinusoid;

G. processing, with a Coordinate Rotation Digital Computer (CORDIC), said in-phase (I) and quadrature (Q) signals to compute said amplitude (a) of said digital sinusoid ~~by applying~~

according to the equation $a = \sqrt{(Q^2 + I^2)}$; and

H. processing, with said CORDIC, said in-phase (I) and quadrature (Q) signals to compute said phase (φ) of said digital sinusoid ~~by applying~~ according to the equation $\varphi = \tan^{-1}(Q/I)$.

37. (currently amended) The method of claim 36 wherein said vibratory sensor comprises one of an accelerometer, a gyroscope, and a microphone~~, a vibration sensor and a chemical sensor~~.

Claims 38-40 (canceled)

41. (New) A system for determining the instantaneous amplitude (a) and phase (φ) of an output analog sinusoidal signal comprising:

a vibratory sensor which produces said output analog sinusoidal signal characterized by an instantaneous phase and amplitude in response to the measurement of a parameter;

an analog-to-digital converter which receives said output analog sinusoidal signal from the vibratory sensor and converts said output analog sinusoidal signal to a digital sinusoid to form the in-phase component (I) of said sinusoid;

a Hilbert transformer approximation device which receives said digital sinusoid and produces the quadrature component (Q) of said digital sinusoid by introducing a phase shift to said digital sinusoid; and

a Coordinate Rotation Digital Computer (CORDIC) comprising:

an amplitude computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous amplitude (a) of said digital sinusoid by processing said in-phase (I) and quadrature (Q) components according to the

cquation $a = \sqrt{(Q^2 + I^2)}$; and

a phase computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous phase (φ) of said digital sinusoid by processing said in-phase (I) and quadrature (Q) components according to the equation $\varphi = \tan^{-1}(Q/I)$.

42. (New) A method of determining the amplitude (a) and phase (φ) of a sinusoid comprising:

A. measuring a parameter of an object with a vibratory sensor;

B. generating an output analog sinusoidal signal characterized by an instantaneous phase and amplitude representative of said parameter;

C. digitizing said output analog sinusoidal signal to produce a digital sinusoid;

D. filtering said digital sinusoid to attenuate out-of-band noise in said digital sinusoid;

E. introducing a delay into said digital sinusoid to produce an in-phase signal (I) associated with said digital sinusoid;

F. performing a Hilbert transform approximation of said digital sinusoid to introduce a phase shift plus delay into said digital sinusoid, thereby producing a quadrature signal (Q) associated with said digital sinusoid;

G. processing, with a Coordinate Rotation Digital Computer (CORDIC), said in-phase (I) and quadrature (Q) signals to compute said amplitude (a) of said digital sinusoid by applying the equation $a = \sqrt{(Q^2 + I^2)}$; and

H. processing said in-phase (I) and quadrature (Q) signals to compute said phase (φ) of said digital sinusoid by applying the equation $\varphi = \tan^{-1}(Q/I)$.